REMARKS

Amendments to the Claims

Claim 29 has been amended to correct an objection. The claim has been amended to present the alternatives in Markush grouping.

No new matter has been added.

Rejections under 35 U.S.C. 103(a)

A. Claims 1-3, 5, 9-11, 14, 16, 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Elspass *et al.* (US 5,807,629), in view of Patil (US 5,498,673), when taken with Li et al (US 6,060,549).

B. Claims 22-23, 29-32, 36-38, 40, 42, 45, and 73-74 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Elspass *et al.* (US 5,807,629), in view of Patil (US 5,498,673), when taken with Li et al (US 6,060,549).

While these rejections are presented separately in the Office Action based upon subject matter, the combination and use of the references are identical and so the rejections are jointly responded to below.

Elspass is cited for teaching a nanocomposite comprising clay and an elastomer comprising copolymers of isobutylene and functionalized paramethyl styrene. In the Office Action, it is conceded that Elspass does not teach a monomer functionalized with groups (I-V) of instant claim 1 or the addition of a grafting promoter and functionalizing compound as recited in claim 22. To remedy this deficiency, Patil is cited for teaching copolymers of isoolefins and para-alkylstyrenes functionalized with an R4 moiety corresponding to instant groups (I-V).

In the current Final Office Action rejections, Elspass and Patil are held to be analogous art "because they are concerned with a similar technical difficulty, namely the preparation of isoolefins and functionalized para-alkylstyrenes." Applicants respectfully disagree with this overly broad generalization of the references to render the references as analogous art.

Contrary to the assertion in the Office Action, Elspass is not concerned "with the preparation of isoolefin and functionalized para-alkylstyrenes." Elspass

is directed to the formation of a nanocomposite; specifically, achieving sufficient disassociation of the clay layers to achieve a fine dispersion of the clay in the polymer (col 1, lines 16-22; col 1, lines 61-67). While four out of fourteen examples of Elspass employ an isobutylene-paramethyl styrene copolymer rubber to obtain a nanocomposite (examples 10, 11, 12, and 14), this does not constitute the entire disclosed invention being concerned with the preparation of para-alkylstyrene functionalized isoolefins.

While Patil *is* concerned with the preparation of isoolefins and functionalized para-alkylstyrenes, the focus of Patil is to improve the bonding and grafting ability of isobutylene rubbers. These are polymers that, due to the highly saturated backbone of the copolymer, provide good air permeability and environmental resistance but are notoriously well known for limited bonding/grafting ability (col 1, lines 10-18). As stated by Patil, the goal of the invention is to enable the functionalized polymer to be "co-reacted or compatibilized with other polymers by grafting techniques" (col 1, lines 22-25). As is, to functionalize the copolymer, Patil must add the new functional group to the alkylstyrene group as the ability to add functionality to the isobutylene backbone is extremely limited, if not non-existent.

In MPEP 2141.01, in discussing the chemical arts, the cited cases suggest that for art to be analogous, the prior art should be directed to solving the same problem (even if in different fields), or if the problem being solved would have logically commended itself to the solution of the problem. Herein, these conditions are not met. The references are not directed to solving the same problem. One is directed to strengthening the mechanical properties of the rubber (Elspass) and the other is directed to improving the grafting ability of the rubber to other compounds (Patil). Additionally, were one looking to solve the problems of Elspass of enhanced exfoliation or mechanical properties , there is nothing in Patil to suggest that the functionalized elastomer would assist in exfoliating different layers in a polymer.

In the Final Office Action rejections it is held that it would have been obvious to use the copolymers of Patil in the invention of Elspass and one would have been motivated to do so since the Patil polymers have utility in forming polymer blends and is "an equivalent alternative means of providing copolymers

of isoolefins and functionalized para-alkylstyrenes." Applicants disagree with the position that the copolymers of Patil and Elspass are "equivalent alternative means" such that the copolymer of Patil would simply be substituted in the nanocomposite of Elspass.

By functionalizing the para-methylstyrene unit, Patil has introduced reactive groups to the isobutylene copolymer, specifically introducing carboxylic and/or carbonyl groups to the copolymer. Such a copolymer is not an equivalent alternative to the non-functionalized isobutylene copolymer; such an assertion actually marginalizes the teachings of Patil. The functionalized isobutylene copolymer of Patil will react and graft and behavior differently than the isobutylene rubbers of Elspass when blended or mixed with other compounds or polymers – as intended by Patil.

Due to the often unpredictable nature of chemical reactions and grafting, there is no assurance that the copolymer of Patil would behave equivalently to a non-functionalized isobutylene copolymer such that one skilled in the art would simply substitute the polymer of Patil in the compound of Elspass. Any suggestion of using the highly functionalized copolymer of Patil in the nanocomposite of Elspass is achieved through selective hindsight application of the prior art.

The inventive nature of Applicants' recited invention is that, surprisingly, using a highly functionalized copolymer with acid and/or ester functionalities, exfoliation of the nanoclay, even that of a pretreated nanoclay, is significantly improved and provides for a copolymer of enhanced impermeability characteristics. Again, due to the often unpredictable nature of chemical reactions and grafting, one skilled in the art would not have expected to achieve the level of success by using an isobutylene copolymer functionalized with acid and esters to improve a nanocomposite.

Li is cited as providing evidence that using a treated clay provides for greater dispersion of the exfoliated layers in the polymer matrix. This may be so, however, such teachings of Li are directed to adding agents to the clay prior to incorporation with the polymer matrix, not the elastomeric polymer as being done in the present invention. Additionally, the swelling agents disclosed by Li appear to be simply cumulative of the onium salts already disclosed by Elspass.

Furthermore, Li is directed to a thermoplastic elastomer that includes a thermoplastic resin that provides the compound with thermoplastic properties – something not disclosed or taught by either Elspass or Patil. Thus, Li is not analogous to either Elspass or Patil, is merely cumulative to Elspass, and provides no teaching or suggestion that acid or ester functionality of the elastomer by will result in an improved nanocomposite as recited by Applicants.

To establish *prima facie* obviousness, there 1) must be some suggestion or motivation in the art to modify or combine the references; 2) must be a reasonable expectation of success and 3) the combined references must teach or suggest all the claim limitations. *Graham v. Deere*

Herein, for the reasons stated above, there is no suggestion or motivation in the art to combine, the references are not related to solving a common problem, and there is no reasonable expectation of success based upon the references cited in the pending rejections. The sole motivation and expectation of success appears to be based upon impermissible hindsight and reconstruction of the recited invention.

Regarding the rejected dependant claims, as the dependant claims incorporate the subject matter of claims 1 and 22, and the rejection fails to establish *prima facie* obviousness for claims 1 and 22, any rejections of the dependent claims based on Elspass as modified by Patil taken with Li also fail. Applicant does not concede the obviousness of any not specifically argued dependent claim.

Non-statutory Double Patenting

The Examiner has provisionally rejected Claims 1-3, 5, 9-12, 14, 16, 19, 20, 22, 23, 28-32, 36-38, 40, 42 and 45 on the ground of non-statutory obviousness-type double patenting as being unpatentable over Claims 1-3, 5-6, 9-11, 13-16, 19-21, 22-24, 28-32, 35-37, 39-42, 45-50, 52-53, 55-56, 59-61, 63-66, 69-71 of co-pending Application No. 10/518,193.

Applicants respectfully submit that, due to the still-unpatented nature of the '193 Application's claims, this rejection should be held in abeyance, e.g., until such point as the pending claims are allowable but for such double patenting rejections. Applicant

respectfully submits that this rejection is not ripe for resolution until all of the claims in the instant case are allowable or issued claims exist in the case to which terminal disclaimers are sought. Upon an indication of allowance of all pending claims in the instant case or if claims issue in the '193 Application, Applicants will submit any proper terminal disclaimers related to those claims.

CONCLUSION

Applicants believe that the foregoing is a full and complete response to the Office Action of record. For the foregoing reasons, Applicants submit that the present claims meet all the requirements for patentability. Accordingly, an early and favorable reconsideration of the rejection, and allowance of pending claims 1-3, 5, 9-12, 14, 16, 19, 20, 22, 23, 28-32, 36-38, 40, 42, 45, 73 and 74 is requested.

The Commissioner is hereby authorized to charge counsel's Deposit Account No. 05-1712 (Docket #: 2002B094), for any fees, including extension of time fees and excess claim fees, required to make this response timely and acceptable to the Office.

Applicants invite the Examiner to telephone the undersigned attorney, if there are any issues outstanding which the Examiner would like to discuss.

Respectfully submitted,

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Date

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